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EXAMINER				
YEUNG LOPEZ, FLETT				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary

Application No.

10/567,883

Applicant(s)

STEIN ET AL.

Examiner

FEI FEI YEUNG LOPEZ

Art Unit

2826

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/1/09.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 13-20, 22-34, 42-45 and 47-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 49 and 51 is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5-10, 14, 15, 17-19, 22, 25-27, 33, 42, 43, 47 and 52 is/are rejected.
- 7) ☒ Claim(s) 2, 4, 13, 16, 20, 23, 24, 28-32, 34, 44, 45, 48 and 50 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-946)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/7/09
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 13-16 and 24 are objected to because of the following informalities:

Claims 13 to 16 depends from a cancelled claim 11.

"[A] carrier" lacks antecedent basis in claim 24.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1,3,10,14,15,17,22,25-27,33,47,52 are rejected under 35 U.S.C. 102(e) as being anticipated by Ledentsov et al (PG Pub 2003/0206741).
4. Regarding claim 1, Ledentsov teaches a radiation-emitting semiconductor component comprising: a semiconductor body (layers 1306 and 1307 in fig. 13, see paragraph [0054]) that includes a first principal surface, a second principal surface and an epitaxially formed semiconductor layer sequence with an electromagnetic radiation generating active zone, said epitaxially formed semiconductor layer sequence forming the semiconductor body and being disposed between the first and the second principal

surfaces; a carrier (layer 1301) supporting the semiconductor body; a first current spreading layer (layer 1304) disposed on said first principal surface and positioned between the semiconductor body and the carrier, and electrically conductively connected to said semiconductor layer sequence; a second current spreading layer (layer 1308) disposed on said second principal surface and electrically conductively connected to said semiconductor layer sequence; and a mirror layer (layer 1302) disposed on a side of the first current spreading layer that faces away from the semiconductor layer sequence, wherein the first current spreading layer comprises a first material and the second current spreading layer comprises a second material different from the first material (one has n type dopants and the other has p type dopants). Note that the limitation "non-epitaxially formed" is a process step that does not carry patentable weight in a device claim since prior art teaches all structural limitations claimed. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

5. Regarding claim 3, Ledentsov teaches the radiation-emitting semiconductor component as in claim 1, wherein at least one of said current spreading layers contains a material that is transparent to the generated radiation (see paragraph [0105]).

6. Regarding claim 10, Ledentsov teaches the radiation-emitting semiconductor component as in claim 1, wherein at least one of said current spreading layers contains Al, Ga (Ga in layer 1308, see paragraph [0052]), In, Ce, Sb and/or F.

7. Regarding claim 14, Ledentsov teaches the radiation-emitting semiconductor component as in claim 11, wherein said mirror layer contains a metal (Al in layer 1302, see paragraph [0057]).

8. Regarding claim 15, Ledentsov teaches the radiation-emitting semiconductor component as in claim 11, wherein said mirror layer contains Au, Ag, Al (layer 1302, see paragraph [0057]) and/or Pt.

9. Regarding claim 17, Ledentsov teaches the radiation-emitting semiconductor component as in claim 1, wherein said semiconductor layer sequence contains at least one n- and/or p-conductive layer (the weakly doped layer 1306 may be either n type or p type).

10. Regarding claim 22, Ledentsov teaches the radiation-emitting semiconductor component as in claim 1, wherein said carrier contains GaAs (layer 1301, see paragraph [0050]).

11. Regarding claim 25, Ledentsov teaches the radiation-emitting semiconductor component as in claim 1, wherein disposed on at least one of the first current spreading layer (layer 1304 see fig. 13) and the second current spreading layer is a contact surface for electrical contacting.

12. Regarding claim 26, Ledentsov teaches the radiation-emitting semiconductor component as in claim 25, wherein said contact surface is disposed on the side of said semiconductor layer sequence opposite to said carrier (layer 1304 see fig. 13).

13. Regarding claim 27, Ledentsov teaches the radiation-emitting semiconductor component as in claim 25, wherein said contact surface has on the side facing said semiconductor layer sequence a layer (layer 1305, which is made of gold, which reflects light, see paragraph [0053]) that reflects the generated radiation.

14. Regarding claim 33, Ledentsov teaches the radiation-emitting semiconductor component as in claim 1, wherein said semiconductor layer sequence contains a III/V semiconductor, preferably $\text{In}_x\text{Ga}_{1-x}\text{As}$ (see paragraph [0054]), where $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x + y \leq 1$.

15. Regarding claim 47, Ledentsov teaches the radiation-emitting semiconductor component as in claim 1, wherein the first current spreading layer and the second current spreading layer are sputtered layers. Note that "sputtered layers" is a process limitation that does not carry patentable weight in a product claim since prior art teaches all structural limitations claimed. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

16. Regarding claim 52, Ledentsov teaches a radiation-emitting semiconductor component comprising: a semiconductor body that includes a first principal surface, a second principal surface and an epitaxially formed semiconductor layer sequence with an electromagnetic radiation generating active zone (layer 1307 in fig. 13), said epitaxially formed semiconductor layer sequence forming the semiconductor body and being disposed between the first and the second principal surfaces; a first current spreading layer (layer 1304) disposed on said first principal surface and electrically conductively connected to said semiconductor layer sequence; a second current spreading layer (layer 1308) disposed on said second principal surface and electrically conductively connected to said semiconductor layer sequence; and a mirror layer (layer 1302) disposed on a side of the first current spreading layer that faces away from the semiconductor layer sequence, the mirror layer completely covering the side of the first current spreading layer, wherein the first current spreading layer comprises a first material and the second current spreading layer comprises a second material different from the first material (one has p type dopants and the other has n type dopants). Note that the limitation "non-epitaxially formed" is a process step that does not carry patentable weight in a device claim since prior art teaches all structural limitations claimed. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is

unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

17. Claims 1,3,5-7,10,14,15,17,18,25,26,42,43,52 are rejected under 35 U.S.C. 102(e) as being anticipated by Chua et al (PG Pub 2003/0231683 A1).

18. Regarding claim 1, Chua teaches a radiation-emitting semiconductor component comprising: a semiconductor body (layers 110,112,114 in fig. 4) that includes a first principal surface, a second principal surface and an epitaxially formed (paragraph [0060]) semiconductor layer sequence with an electromagnetic radiation generating active zone, said epitaxially formed semiconductor layer sequence forming the semiconductor body and being disposed between the first and the second principal surfaces; a carrier (layer 146) supporting the semiconductor body; a first current spreading layer (layer 108) disposed on said first principal surface and positioned between the semiconductor body and the carrier, and electrically conductively connected to said semiconductor layer sequence; a second non-epitaxially formed current spreading layer (layer 118, paragraphs [0036] and [0060]) disposed on said second principal surface and electrically conductively connected to said semiconductor layer sequence; and a mirror layer (layer 142) disposed on a side of the first current spreading layer that faces away from the semiconductor layer sequence, wherein the first current spreading layer comprises a first material and the second current spreading layer comprises a second material different from the first material (see paragraph [0040]). Note that the limitation "non-epitaxially formed" is a process step that does not

carry patentable weight in a device claim since prior art teaches all structural limitations claimed. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

19. Regarding claim 3, Chua teaches the radiation-emitting semiconductor component as in claim 1, wherein at least one of said current spreading layers contains a material that is transparent to the generated radiation (layer 118 see paragraph [0040]).

20. Regarding claim 5, Chua teaches the radiation-emitting semiconductor component as in claim 3, wherein-said radiation-transparent material contains an oxide (see paragraph [0040]).

21. Regarding claim 6, Chua teaches the radiation-emitting semiconductor component as in claim 5, wherein said oxide is a metal oxide (see paragraph [0040]).

22. Regarding claim 7, Chua teaches the radiation-emitting semiconductor component as in claim 3, wherein said radiation-transparent material contains ITO (see paragraph [0040]).

23. Regarding claim 10, Chua teaches the radiation-emitting semiconductor component as in claim 1, wherein at least one of said current spreading layers contains Ga (Ga in layer 108 in fig. 4).

24. Regarding claim 14, Chua teaches the radiation-emitting semiconductor component as in claim 11, wherein said mirror layer contains a metal (Al, see paragraph [0057]).
25. Regarding claim 15, Chua teaches the radiation-emitting semiconductor component as in claim 11, wherein said mirror layer contains Au, Ag, Al (see paragraph [0057]) and/or Pt.
26. Regarding claim 17, Chua teaches the radiation-emitting semiconductor component as in claim 1, wherein said semiconductor layer sequence contains at least one n- and/or p-conductive layer (layer 114 in fig. 4, see paragraph [0039]).
27. Regarding claim 18, Chua teaches the radiation-emitting semiconductor component as in claim 17, wherein the thickness of said n-conductive and/or said p-conductive layer is in the range of a monolayer to 1000 nm (layer 114, see paragraph [0039]).
28. Regarding claim 25, Chua teaches the radiation-emitting semiconductor component as in claim 1, wherein disposed on at least one of the first current spreading layer and the second current spreading layer (layer 118 in fig. 4) is a contact surface for electrical contacting.
29. Regarding claim 26, Chua teaches the radiation-emitting semiconductor component as in claim 25, wherein said contact surface is disposed on the side of said semiconductor layer sequence opposite to said carrier (fig. 4).

30. Regarding claim 42, Chua teaches the radiation-emitting semiconductor component as in claim 18, wherein the thickness of said n-conductive and/or said p-conductive layer is less than 400 nm (layer 114, see paragraph [0039]).

31. Regarding claim 43, Chua teaches the radiation-emitting semiconductor component as in claim 42, wherein the thickness of said n-conductive and/or said p-conductive layer is between 150 nm and 400 nm (layer 114, see paragraph [0039]).

32. Regarding claim 52, Chua teaches a radiation-emitting semiconductor component comprising: a semiconductor body that includes a first principal surface, a second principal surface and an epitaxially formed semiconductor layer sequence with an electromagnetic radiation generating active zone (layers 110,112,114 fig. 4), said epitaxially formed semiconductor layer sequence forming the semiconductor body and being disposed between the first and the second principal surfaces; a first current spreading layer (layer 108) disposed on said first principal surface and electrically conductively connected to said semiconductor layer sequence; a second non-epitaxially formed current spreading layer (layer 118 see paragraphs [0036] and [0060]) disposed on said second principal surface and electrically conductively connected to said semiconductor layer sequence; and a mirror layer (layer 142) disposed on a side of the first current spreading layer that faces away from the semiconductor layer sequence, the mirror layer completely covering the side of the first current spreading layer, wherein the first current spreading layer comprises a first material and the second current spreading layer comprises a second material different from the first material (see paragraph [0040]). Note that the limitation "non-epitaxially formed" is a process step

that does not carry patentable weight in a device claim since prior art teaches all structural limitations claimed. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

Claim Rejections - 35 USC § 103

33. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

34. Claims 8, 9, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chua et al (PG Pub 2003/0231683 A1) as applied to claims 3 and 17 above, and further in view of Lin et al (PG Pub 2004/0211968 A1).

35. Regarding claims 8 and 9, Chua remains as applied in claim 3 above. However, Chua does not teach said radiation-transparent material contains ZnO or SnO. On the other hand, Chua teaches that the radiation-transparent material is made of ITO (layer 118 in fig. 4, see paragraphs [0036] and [0060]). In the same field of endeavor, Lin teaches ZnO and SnO are alternative materials of ITO (paragraph [0039]). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use ZnO or SnO as a material for the radiation-transparent material since Lin teaches ZnO and SnO are alternative materials of ITO.

36. Regarding claim 19, Chua remains as applied in claim 3 above. However, Chua does not teach wherein the current spreading layer on the side comprising the p-conductive layer of the semiconductor layer sequence contains ZnO. On the other hand, Chua teaches that wherein the current spreading layer on the side comprising the p-conductive layer of the semiconductor layer sequence contains ZnO (layer 118 in fig. 4, see paragraphs [0036] and [0060]). In the same field of endeavor, Lin teaches ZnO is one of alternative materials of ITO (paragraph [0039]). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use ZnO as a material for the radiation-transparent material since Lin teaches ZnO is an alternative material of ITO.

Response to Arguments

37. Applicant's arguments with respect to claims 1-10,13-20,22-34,42-45,47,48,50,52 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

38. Claims 49 and 51 are allowed.

Regarding claim 49, prior art does not a radiation-emitting semiconductor having a semiconductor body sandwiching between a first principal surface and a second principal surface, including semiconductor layer sequence including an electromagnetic radiating area, and forming on top of a carrier; a first non-epitaxially formed metal oxide current spreading layer formed between the carrier and the semiconductor body and being electrically connected to the semiconductor layer sequence; a second non-epitaxially formed metal oxide current spreading layer formed on the semiconductor body and also being electrically connected to the semiconductor layer sequence; a mirror is formed under the first current spreading layer, wherein the first current spreading layer has a different material than the second current spreading layer.

Claim 51 is allowed because it depends from an allowed claim 49.

39. Claims 2,4,13,16,20,23,24,28-32,34,44,45,48,50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

40. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FEI FEI YEUNG LOPEZ whose telephone number is (571)270-1882. The examiner can normally be reached on 7:30am-5:00pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

FYL
/Feifei Yeung-Lopez/
Examiner, Art Unit 2826

/Minh-Loan T. Tran/
Primary Examiner
Art Unit 2826